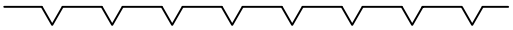
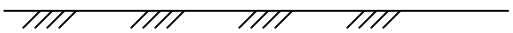
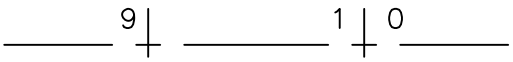
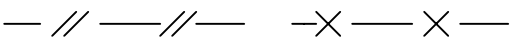
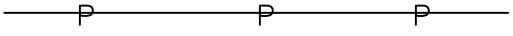
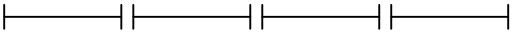
APPENDIX A

Graphic Standards

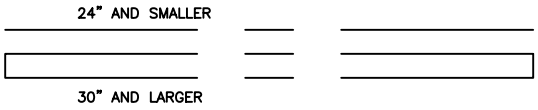
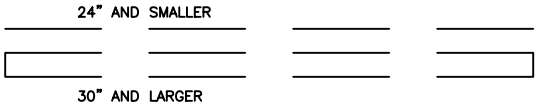
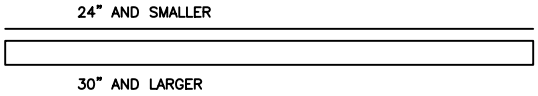
GRAPHIC STANDARDS:

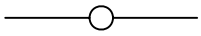
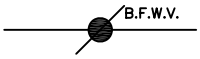
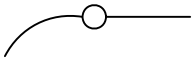
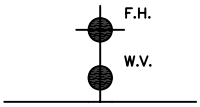
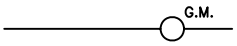
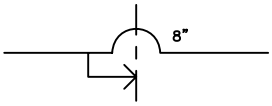
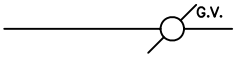
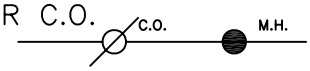
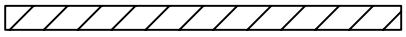
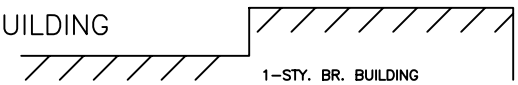
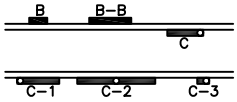
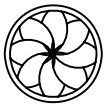
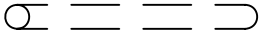
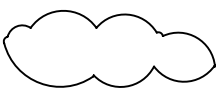
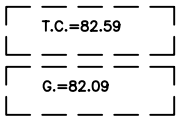
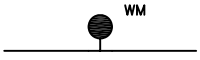
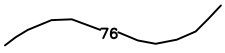
EXISTING:

PLAN FEATURE	PLAN VIEW	WT	LC
ROW LINE		3	0
PROPERTY LINE		3	0
LOT LINES		1	0
EASEMENT LINE		0	2
THEORETICAL PROPERTY LINE		3	0
DIMENSION LINE		0	0
DITCHES, LEFT (NORTH SIDE)		0	0
CENTER LINE OF DITCH		0	2
DITCHES, LEFT (SOUTH SIDE)		0	0
EDGE ASPHALT		0	0
EDGE CONCRETE		0	0
EDGE SHELL OR GRAVEL		0	2
CURB LINE		0	0
CENTER LNE OF R.O.W.		0	4
TRANSIT LINE/BASELINE		0	0
FENCE LINE		0	0
GAS LINE		0	1
ELECTRICAL SERVICE AERIAL LINE		0	0
ELECTRICAL SERVICE CONDUIT LINE		0	6
PIPELINE AND/OR WESTERN UNION CONDUIT		0	1
TELEPHONE/COMMUNICATIONS CONDUIT		0	2
MISC. UNDERGROUND LINES		0	8
CABLE TV		0	2
RAILROAD		0	0
MATCH LINE (LINE WEIGHT 3)		3	0

GRAPHIC STANDARDS:

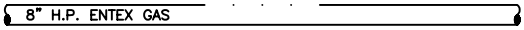
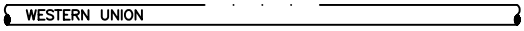
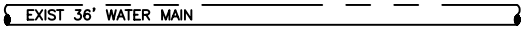
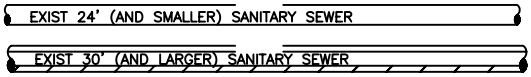
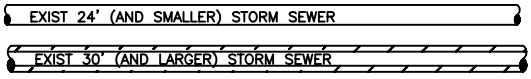
EXISTING (CONTINUED):

PLAN FEATURE	PLAN VIEW	WT	LC
WATER LINE		0	7
SANITARY SEWER LINE		0	3
STORM SEWER LINE		0	0

	WT	LC		WT	LC
IRON PIPES OR IRON ROD MONUMNETS 	0	0	WATER VALVE (GATE)	0	0
POINT OF INTERSECTION 	0	0	WATER VALVE (BUTTERFLY) 	0	0
POINT OF CURVE OR POINT OF TANGENT 	0	0	FIRE HYDRANT 	0	0
POWER POLE 	0	0	TAPPING SLEEVE AND VALVE 	0	0
POWER POLE DOWN GUY 	0	0	REDUCER 	0	0
GAS METER 	0	0	ROUND CONNECTIONS 	0	7
GAS VALVE 	0	0	SAN. SEWER C.O. & MH 	0	0
HEADER 	0	0	STORM SEWER MH 	0	0
BUILDING 	0	0	STORM SEWER INLETS 	0	0
TREE 	0	0	CULVERT PIPE 	0	2
HEDGE 	0	0	TOP OF CURB OR GUTTER LINE ELEV. 	0	2
WATER METER 	0	0	CONTOUR LINE 	0	0

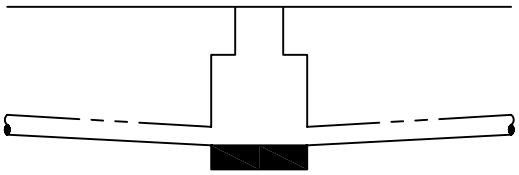
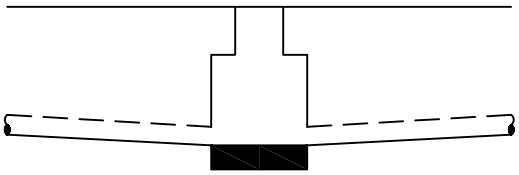
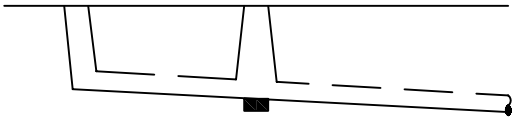
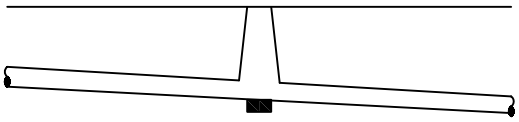
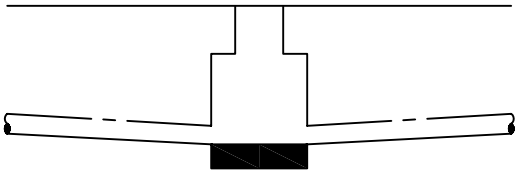
GRAPHIC STANDARDS:

EXISTING:

PROFILE FEATURE	PLAN VIEW	WT	LC
NOTE: PIPES LESS THAN 4" IN DIAMETER DON'T NEED TO BE SHOWN IN PROFILE			
NORTH OR EAST PROPERTY LINE		1	5
SOUTH OR WEST PROPERTY LINE		1	6
NORTH OR EAST DITCH OR CURB		1	7
SOUTH OR WEST DITCH OR CURB		1	3
CENTER LINE OF R.O.W.		1	4
NORTH OR EAST CULVERT		1	2
SOUTH OR WEST CULVERT		1	2
H.L. & P/RELIANT CO. CONDUIT		1 1	6 0
GAS LINE		1 1	1 0
WESTERN UNION		1 1	1 0
S.B.C. TELEPHONE CONDUIT		1 1	2 0
WATER LINE		1 1	7 0
WASTEWATER LINE		1 1 1 1	3 0 3 0
STORM SEWER LINE		1 1 1 1	0 0 0 0

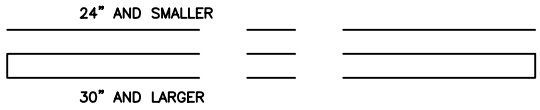
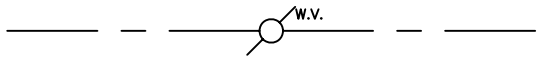
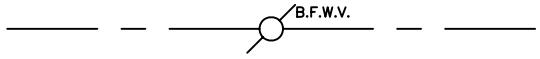
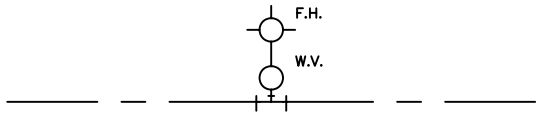
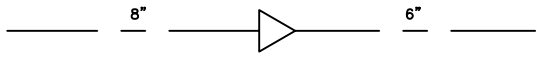
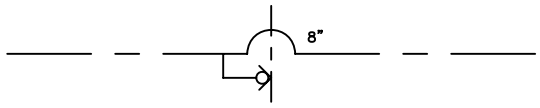
GRAPHIC STANDARDS:

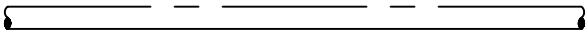
EXISTING:

PLAN FEATURE	PLAN VIEW	WT	LC
ELECTRICAL CO. MANHOLE		1	6
TELEPHONE/COMM. MANHOLE		1	2
SANITARY SEWER MANHOLE AND CLEANOUT		1	3
STORM SEWER MANHOLE		1	0
WATER MANHOLE		1	7

GRAPHIC STANDARDS:

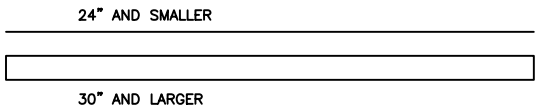
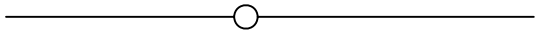
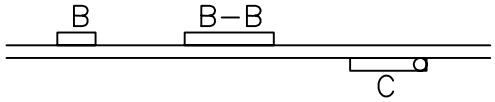
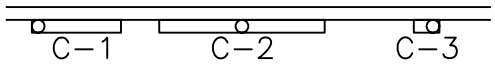
PROPOSED:

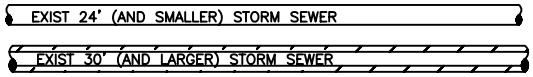
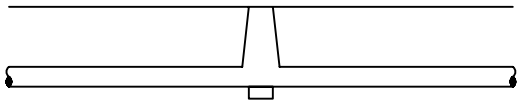
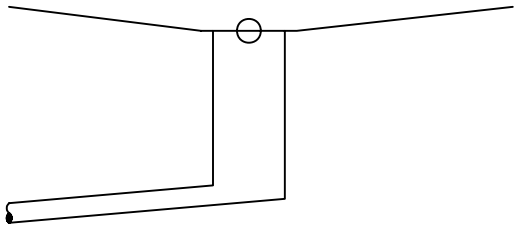
PLAN FEATURE	PLAN VIEW	WT	LC
WATER LINE		3	7
WATER VALVE (GATE)		3	7
WATER VALVE (BUTTERFLY)		3	7
FIRE HYDRANT		3	7
TAPPING SLEEVE		3	7
REDUCER		3	7
ROUND CONNECTIONS		3	7

PROFILE FEATURE	PROFILE VIEW	WT	LC
WATER LINE		3 3	7 0

GRAPHIC STANDARDS:

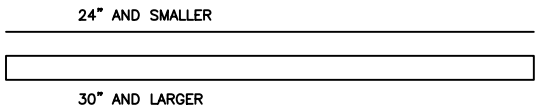
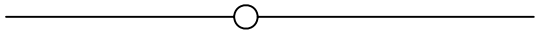
PROPOSED:

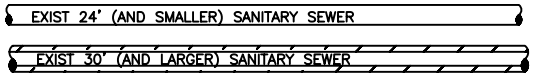
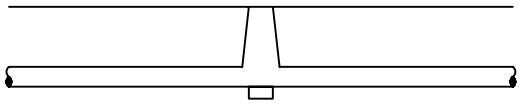
PLAN FEATURE	PLAN VIEW	WT	LC
STORM SEWER LINES		3 3	0 0
MANHOLE		3	0
INLETS		3	0
		3	0

PROFILE FEATURE	PROFILE VIEW	WT	LC
STORM SEWER LINES		3 3	0 0
MANHOLE		3	0
INLET		3	0

GRAPHIC STANDARDS:

PROPOSED:

PLAN FEATURE	PLAN VIEW	WT	LC
SANITARY SEWER LINES		3 3	3 3
MANHOLE		3	0

PROFILE FEATURE	PROFILE VIEW	WT	LC
SANITARY SEWER LINES		3 3 3 3	3 0 3 0
MANHOLE		3	0

GRAPHIC STANDARDS:

PROPOSED:

PLAN FEATURE	PLAN VIEW	WT	LC
FACE OF CURB		6	3
EDGE OF PAVEMENT		6	0
CONCRETE WALK	5' CONCRETE WALK	3 2 3	3 0 3
CONCRETE HEADER		3	3
TOP OF CURB OR GUTTER ELEVATION	T.C.=82.59 G.=82.09	2	0

PROFILE FEATURE	PROFILE VIEW	WT	LC
TOP OF CURB OR CENTER LINE OF OPEN DITCH PAVING	T.C. OR CL @ +0.20% T.C. OR CL @ −0.20%	2 3	0 3

LINE CODE DEFINITIONS
ALL LENGTHS IN INCHES

LINE CODE "0" SOLID LINE

LINE CODE "1" .8" LINE, .05" SPACE, .025" LINE, .05" SPACE, .025" LINE, .05" SPACE, .025" LINE, .05" SPACE, .8" LINE

LINE CODE "2" .1875" LINE, .05" SPACE, .1875" LINE

LINE CODE "3" .9" LINE, .125" SPACE, .9" LINE

LINE CODE "4" 1.25" LINE, .125" SPACE, .030" LINE, .125" SPACE, 1.25" LINE

LINE CODE "5" .9" LINE, .125" SPACE, .03" LINE, .125" SPACE, .03" LINE, .125" SPACE, .03" LINE, .125" SPACE, .9" LINE

LINE CODE "6" .9" LINE, .125" SPACE, .1" LINE, .125" SPACE, .1" LINE, .125" SPACE, .9" LINE

LINE CODE "7" .9" LINE, .1" SPACE, .1" LINE, .1" SPACE, .9" LINE

LINE CODE "8" .9" LINE, .2" SPACE, .9" LINE

APPENDIX B

Reserved

APPENDIX C

Sanitary Sewer – Peak Design Factor

APPENDIX C

SANITARY SEWER - PEAK DESIGN FACTOR

All gravity sewers will be designed to accommodate the peak flow from the contributing drainage area. The peak flow will be computed using the appropriate peaking factor, F, multiplied by the average day flow for the contributing area. For non-residential areas, the peak flow should include consideration of flow characteristics from the anticipated development. In all cases, the design peaking factor, F, shall meet or exceed the values as follows:

An equivalent population less than 5,000 persons,

$$F = 4$$

An equivalent population greater than or equal to 5,000 persons,

$$F = (14/(3.316 + P^{0.5})) + 1.5$$

for, P = equivalent population in thousands

Additional consideration of peak flow shall be given for design of pumping stations. The impact of pumping stations on the upstream and downstream sanitary sewer system shall be evaluated. The peak flow for design of a pumping station shall be based on the actual flow into the station. A reduced peak flow, based on the peaking factor presented above, may be used for design of larger pumping stations provided a detailed hydraulic analysis is performed on the sanitary sewer system. Specific approval by the Department of Public Works shall be required prior to use of a reduced peak flow for the design of a pumping station and related sanitary sewer system.

APPENDIX D

Mandrel Requirements

APPENDIX D

MANDREL REQUIREMENTS

All gravity sanitary sewers, constructed using P.V.C. pipe, shall be tested using a Mandrel that will measure five percent (5%) deflection in the pipe. ASTM 3034, current, provides diameters for seven and one-half percent (7-1/2%) deflection. Five percent (5%) deflection requirements are listed below.

P.V.C. PIPE - SDR-26

Nominal Pipe Size (In.) (In.)	Average Inside Diameter (In.)	Base Inside Diameter (In.)	5% Deflection Mandrel
6	5.764	5.612	5.33
8	7.715	7.488	7.11
10	9.644	9.342	8.87
12	11.480	11.102	10.55
15	14.053	13.575	12.90

For P.V.C. pipe sizes larger than fifteen inch (15") diameter, specific requirements for the Mandrel will be established by the Department of Public Works.

APPENDIX E
Street Lighting

APPENDIX E

STREET LIGHTING REQUIREMENTS

Street Type	Pavement Width	Right-of-Way Width	Minimum-Maximum Distance (1.)	Lumens (2.)
Minor/Local	22-28′	50-60′	195-260′	9,500
Collector/ Commercial	36-48′	60-80′	195-260′ 225-350′	9,500 16,000
Divided Roads	25-37′ (2 each)	80-200′+	195-260′(4.) 225-350′(4.) 275-450′(4.)	9,500 16,000(5.) 25,500(5.)

Notes:

1. Distances are measured along centerline of road. Shorter distances may apply in the vicinity of street intersections.

2. All lights shall be High Pressure Sodium Vapor with elliptical lighting pattern. Due to this lighting pattern, it is recommended that street lights not be installed within the radius of a cul-de-sac.

3. Where practical, lights shall be located on alternating sides of roadway.

4. Distance applies to each side of a divided roadway, i.e. double the number of lights.

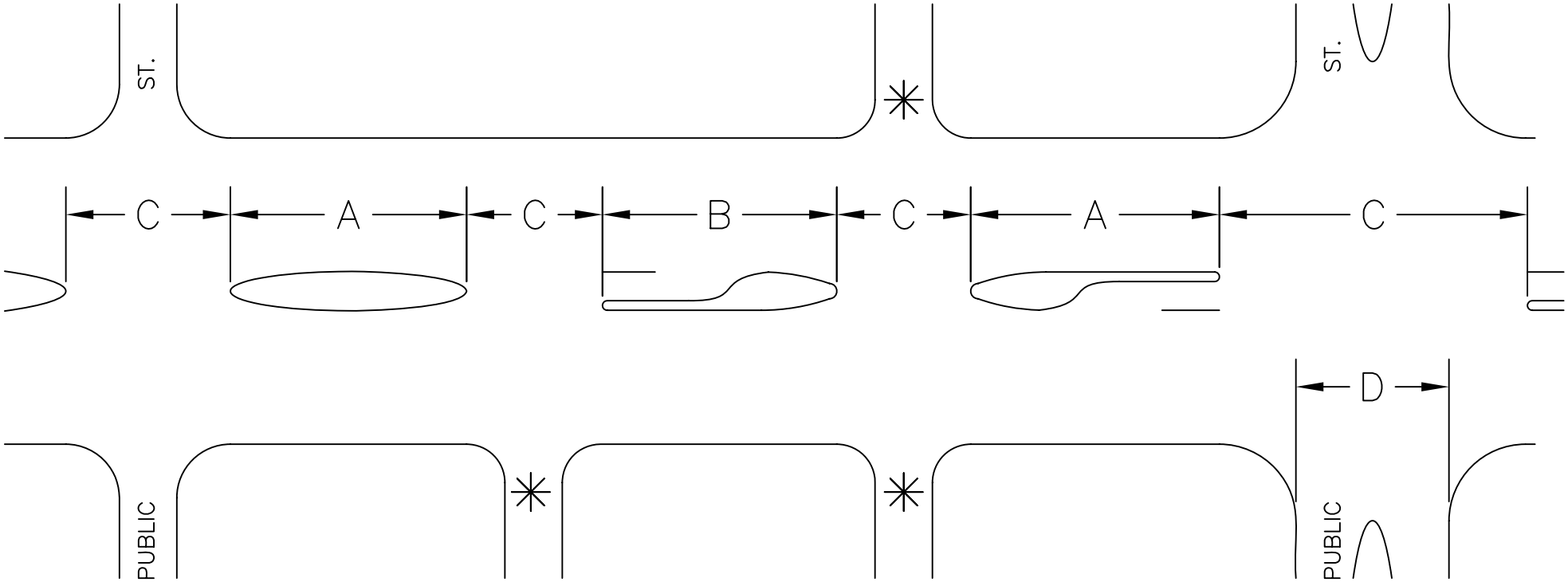
5. For boulevard streets, double-arm steel standards in the median may be utilized with 16,000 lumen and 25,500 lumen lights. Light standards and electrical conduit should not conflict with public facilities in the right-of-way.

6. For acceptable street light standards, refer to the City of Sugar Land Approved Products List.

7. All street light fixtures shall be full cut-off fixtures to minimize light pollution.

APPENDIX F
Pavement Geometric Design Guidelines

TYPICAL LENGTH OF MEDIAN AND MEDIAN OPENING

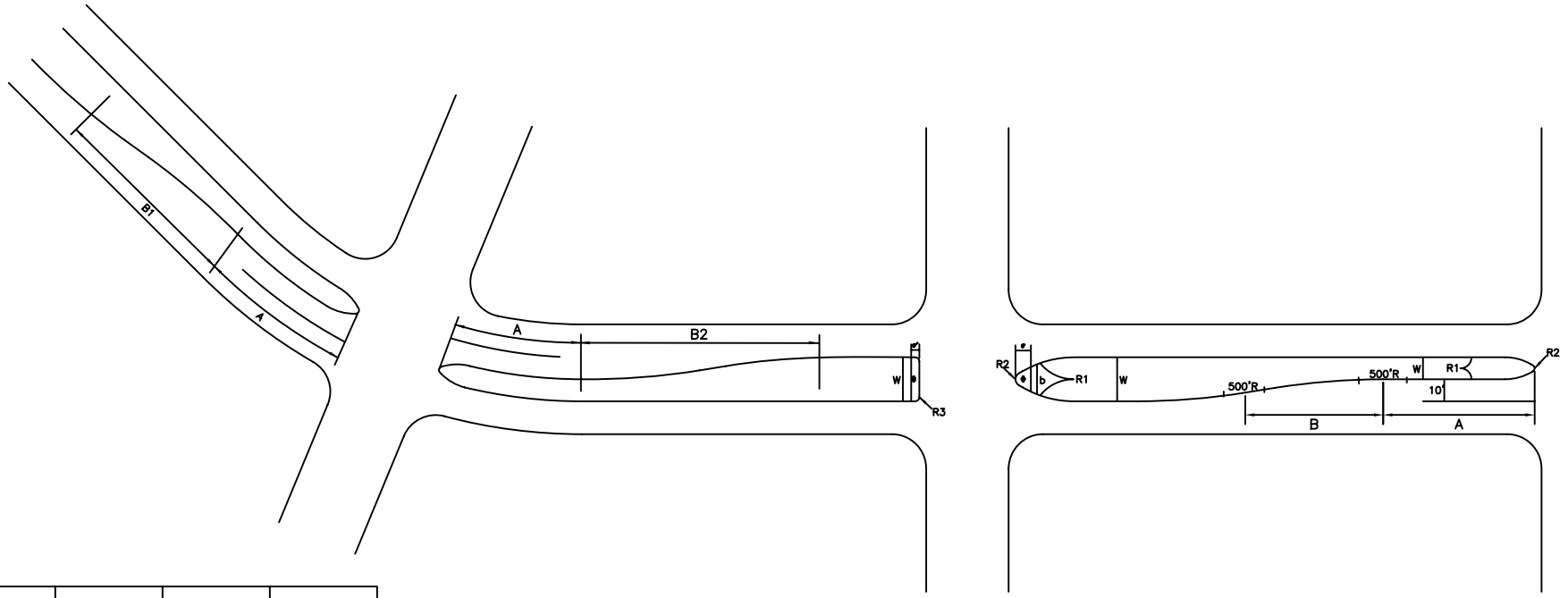


TYPICAL LENGTH OF MEDIAN OPENING "C" = 50' OR D + 10" WHICHEVER IS GREATER

MINIMUM ACCEPTABLE MEDIAN LENGTH FOR TYPE OF STREET

IF PLANNED DIVIDED STREET IS	PURPOSE OF MEDIAN INTERRUPTION			
	ARTERIAL/ HIGHWAY (A)	COLLECTOR STREET (A)	LOCAL STREET (A)	PRIVATE STREET OR DRIVEWAY (B)
ARTERIAL/HIGHWAY	350'	300'	300'	300'
COLLECTOR STREET	300'	250'	250'	250'
LOCAL STREET	250'	250'	250'	200'

MEDIAN NOSE AND LEFT TURN BAY DESIGN



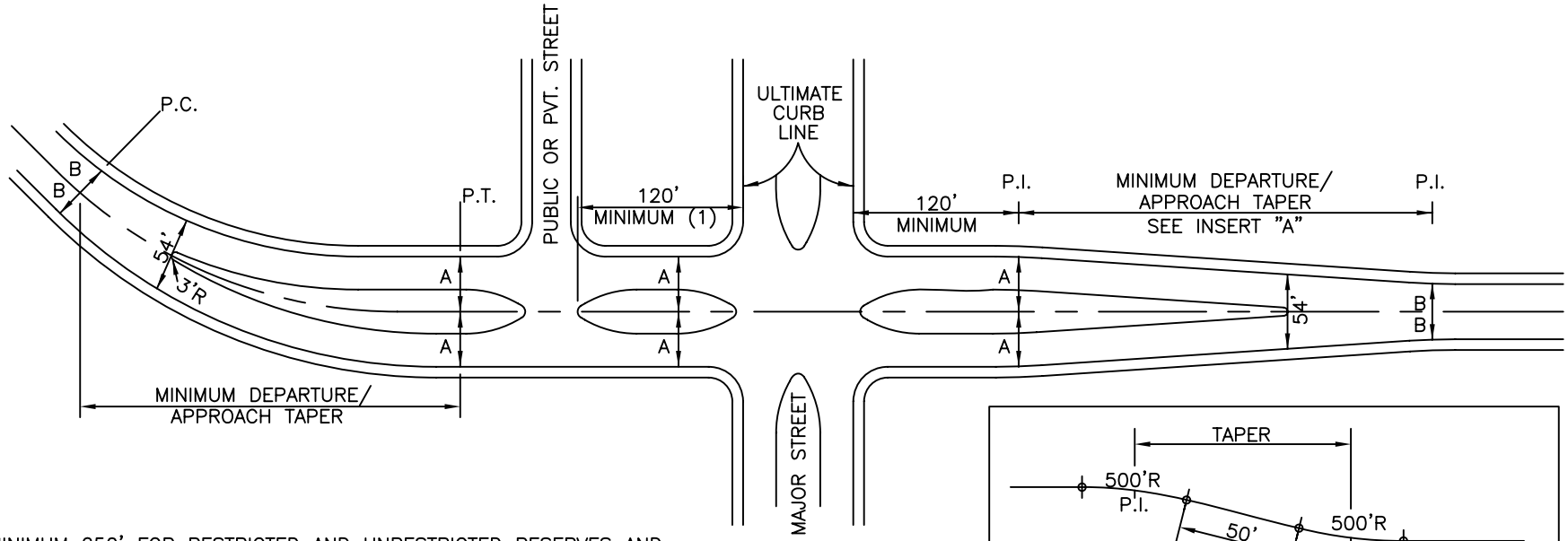
W	R1	R2	R3
≤8'	NONE	W/2	NA
>8'≤38'	90'	W/5	NA
>38'	NONE	NONE	15'

NA = NOT APPLICABLE

A = 150' MINIMUM AT INTERSECTION OF TWO MAJOR STREETS
= 100' MINIMUM AT ALL OTHER INTERSECTIONS.
B = 100' MINIMUM ON STRAIGHT ROADWAY (FOR SINGLE LEFT)
= 150' MINIMUM ON STRAIGHT ROADWAY (FOR DUAL LEFT)
B1 = TAPER LENGTH MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT
B2 = TAPER LENGTH MAY BE LONGER IF CURVES TO THE RIGHT

NOTE: DIMENSIONS MAY BE ADJUSTED AS DETERMINED BY THE ENGINEERING DEPARTMENT. THE ABOVE LENGTHS ARE MINIMUM DISTANCE AND MAY REQUIRE ADJUSTING TO COMPLY WITH ACCEPTABLE ENGINEERING PRACTICES OR AN APPROVED TRAFFIC IMPACT ANALYSIS.

ROADWAY TAPERS FOR SUBDIVISION STREETS



1. MINIMUM 250' FOR RESTRICTED AND UNRESTRICTED RESERVES AND LOCATIONS WHERE A LEFT TURN LANE MAY BE REQUIRED.

2. MEDIAN OPENINGS MAY NOT BE ALLOWED IF MEDIAN LENGTH IS LESS THAN 250' IN LENGTH.

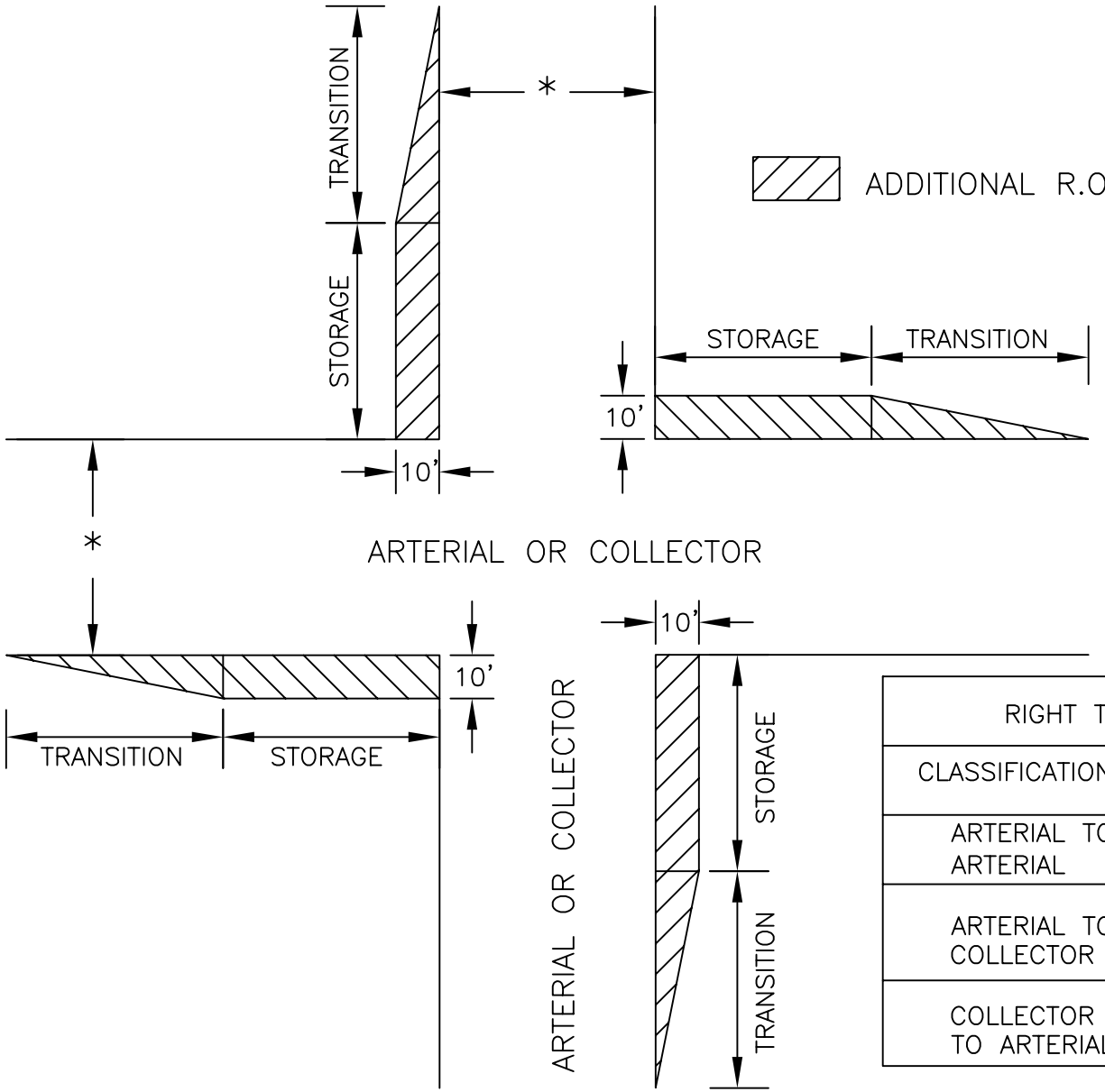
NOTE:
A. APPROACH AND DEPARTURE TAPER REQUIREMENT:
$L=\frac{WS^2}{60}$ L= LENGTH IN FEET
S= SPEED IN M.P.H.
W= LATERAL OFFSET IN FEET
FOR S < 40
S=30 M.P.H. MINIMUM DESIGN SPEED FOR LOCAL STREETS
S=35 M.P.H. MININUM DESIGN SPEED FOR COLLECTOR STREETS

FOR S ≥ 45
L=WS
W=A–B

QUICK REFERENCE GUIDE

ROADWAY TYPE	DESIGN SPEED (m.p.h.)	ROADWAY CROSS SEC. (FT) A+A	ROADWAY CROSS SEC. (FT) B+B	CALCULATED TAPER $L=\frac{WS^2}{60}$ (FEET)	DESIGN TAPER
L2U TO C4D	30	56	27	217.5	218
C2U TO C4D	35	56	36	204.2	205
C2U TO C4D	35	56	40	163.3	164
C2U TO P4D	40	76	36	533.3	534
C2U TO P4D	40	76	40	480.0	480

RIGHT TURN LANE RIGHT-OF-WAY REQUIREMENTS



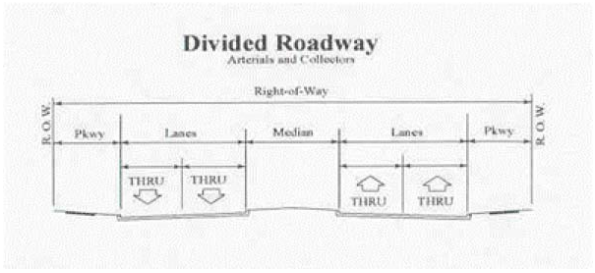
RIGHT TURN LANE R.O.W. DIMENSIONS	
CLASSIFICATION	DIMENSIONS
ARTERIAL TO ARTERIAL	150' STORAGE; 150' TRANSITION (OR AS DETERMINED BY STUDY)
ARTERIAL TO COLLECTOR	100' STORAGE, 150' TRANSITION
COLLECTOR TO ARTERIAL	100' STORAGE; 100' TRANSITION

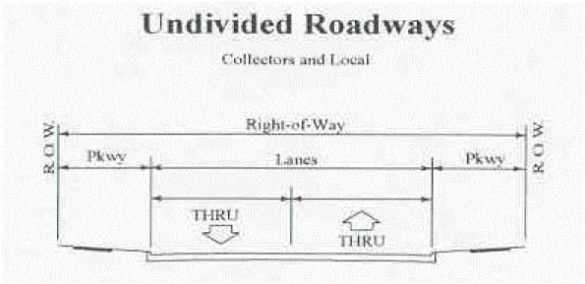
* AS DETERMINED BY APPENDIX F-5

GEOMETRIC STREET DESIGN STANDARDS (Minimum Standards)

Roadway Type

Design Element	P8D	P6D	P4D	C4D	C4U (3)	C2U	L2U
Number of Traffic Lanes	8	6	4	4	4	2	2
Lane Width (Ft.)	12	12	12	11	11	36' F-F;40' FF (2)	27' F-F
R.O.W. Width	150	130	105	80	70	60	50
Design Speed (MPH)	40-50	40-50	40-50	30-40	30-40	30-40	20-30
Max. Grade (%)	6	6	6	8	8	8	10
Stopping Sight Distance (Ft.)	325-525	325-525	325-475	200-325	200-325	200-325	125-200
Horizontal Curvature Min. Radius (Ft.)	2000	2000	2000	850	850	850	450 or 300(1)
Vertical Clearance (Ft.)	15.5	15.5	15.5	15.5	15.5	15.5	15.5
Lateral Clearance (Ft.)	6	6	6	6	6	6	6
Min. Median Width (Ft.)	28	28	28	12	N/A	N/A	N/A
Parking Permitted	No	No	No	No	No	Some	Yes
Parkway Width (Ft.)	13	15	14.5	12	13	12';10' (2)	11.5





Median Width and Parkway Width Include Curb Widths
FF= Face to Face of Curb
(1) For local streets less than 2000' long.
(2) 36' pavement only for residential collectors without driveway connections
(3) For Industrial Zones

Appendix F-5 (Revised January 2004)